people. This agrees with the experience of other travellers.

The English expedition has now discovered a pygmy population in Netherlands New Guinea, which presumably is allied to that inhabiting German New Guinea, and, judging from their stature, which is all we have to go upon, we may regard them as being very little, if at all, mixed with a Papuan element. From the descriptions and illustrations given of the pygmies from German New Guinea, there is little doubt that they are Negritos or Negritos crossed with Papuans, and doubtless the same will be found to be the case for those from Netherlands New Guinea.

Several travellers, such as Guppy and Ribbe, report the occurrence of very short people in the interior of the larger islands of the Bismarck Archipelago and of the Solomon Islands; but there is no evidence of a Negrito race still existing there as such, though the very short statures point to a Negrito mixture. This conclusion is strengthened by the recent investigations of Dr. R. Thurnwald (*Zeitschr. für Ethnol.*). He refers to very small people in the mountainous interior of Bougainville, and he measured (p. 109) one man from Mari mountain with a stature of 1·39 m. (4 feet 6½ inches). These people speak a non-Melanesian language. He informs us that "In the people nowadays met with in these mountains we have before us, however, no unmixed race, but, besides representatives of a small, short-legged, broad-faced, short-skulled, more hairy, wide-nosed people, we encounter types recalling the Solomon Islanders. . . . Whether this mountain type is really dwarfish, as the legend goes, must remain undecided." Rascher states that the existence of dwarfs is commonly believed in New Britain. They are reported to live in clefts in the rocks and steal fruit from the gardens. They are so tiny that one stands on the shoulders of another, and so on, until they reach the fruit. The fruit is not thrown down, lest a noise would be made, but passed from hand to hand, until it reaches the chief, who is on the ground.

A. C. HADDON.

NOTES.

THE annual visitation of the Royal Observatory, Greenwich, will be held on Saturday, June 18.

AT the request of the Association of American Agricultural and Experiment Stations, Prof. J. C. Ewart, F.R.S., of Edinburgh, will give a course of lectures on the principles of breeding, at Ames, Iowa, in July.

M. DARBOUX, permanent secretary of the Paris Academy of Sciences, has been elected president of the Société de secours des Amis des Sciences, and M. Picard, president of the academy, has been elected vice-president of the society.

WITH the view of collecting material for the life of the late Prof. Alexander Agassiz, we are asked to state that anyone having any of his letters will confer a favour by sending them to his son, Mr. G. R. Agassiz, Museum of Comparative Zoology, Cambridge, Mass., U.S.A. The letters will be copied if desired, and the originals returned to the owner as soon as possible. If any persons are unwilling to part with the original letters, Mr. Agassiz would be glad if they would have copies made at his expense and send them to him at their convenience.

TO-DAY, at the University of Halle, the sixtieth birthday of Prof. W. Roux, the founder of the modern science of experimental embryology, is being celebrated. His numerous pupils and other admirers are expressing their appreciation of the magnificent work which he has accomplished for biological science in the manner customary in German universities, by the publication of a "Festschrift" and the presentation of an address. We do not doubt that we are expressing the feelings of all British biologists in offering to Prof. Roux our heartiest congratulations on this occasion, and in hoping that he will long continue to illuminate the study of animal development by his brilliant investigations.

A SEVERE earthquake occurred in the province of Avellino, east of Naples, at 3.5 a.m. on June 7. The disturbance caused considerable damage in Calitri—about fifty miles east of the town of Avellino—and Calabritto, another small mountain town. The shock was felt also in Naples, Benevento, and other places in southern Italy.

DR. DAVID STARR JORDAN, the president of Leland Stanford Junior University, California, will leave at the end of the academic year for Europe, where he will spend his first vacation for a quarter of a century. He expects to devote some of his time to the two-fold "holiday task" of promoting a zoological congress and assisting the peace movement.

AMERICA has lost a veteran science teacher by the death, in his seventy-fifth year, of Dr. G. F. Barker, who was professor of physics at the University of Pennsylvania from 1872 to 1900. He was appointed U.S. commissioner to the Electrical Exhibitions held at Paris in 1881 and at Philadelphia in 1884, and was a member of the jury on awards at the Columbian Exposition of 1893. In 1879 he was president of the American Association for the Advancement of Science. Prof. Barker was the first person to exhibit radium in America. The death is also announced of Dr. Franklin Clement Robinson, who had held the chair of chemistry at Bowdoin College, Maine, since 1874. He was president of the American Public Health Association in 1906. He was a frequent contributor to the American Chemical Journal, and had written text-books on the metals and qualitative analysis.

DURING the evening of June 2 Mr. C. S. Rolls travelled with a biplane from Dover to Sangatte, and, after circling over the semaphore station there, he returned to Dover, thus making the first double journey across the English Channel. The whole journey occupied 90 minutes, and was made at an average height of 800 feet. The Army experimental airship *Beta* made a successful flight from the balloon works at Farnborough to London and back during the night following June 3. On the journey to London the *Beta* travelled against a light wind from the north-east, and made a speed of 26 miles an hour. The greatest height attained during the flight was 1800 feet, and the mean altitude about 1000 feet. The engines of the airship are of 35 horse-power. The journey back from Southwark to Farnborough occupied 1h. 28m.

A BUST of Pasteur was unveiled in the garden of the Ecole Normale Supérieure, Paris, on June 5. The *Morning Post* Paris correspondent reports that M. Lavisse, of the French Academy, made a speech in the name of the Normal School. He recalled the fact that Pasteur spent thirty-seven years in the famous college, and that his first laboratory consisted of two garrets in its buildings. He spoke of Pasteur's relentless warfare against the forces of nature hostile to man; it was only after five years' study that he discovered the remedy for rabies. Above all things he was an indefatigable worker. "He called the interval of night 'hours of waiting,' which always seemed to him slow to pass." His method was based on two principles: first, on curiosity; secondly, on the determination to discover. M. Lavisse dwelt on Pasteur's faith in science and the fascination of mystery to his mind.

FOLLOWING upon the invitation to the British Association from the Corporation of Portsmouth to hold the annual meeting at that town next year, a public meeting, presided over by the Mayor, Sir William Dupree, was held recently, at which the names of several influential and well-known gentlemen were submitted as vice-presidents. Two local secretaries were appointed in Mr. G. Hammond Etherton, Town Clerk, and Dr. A. Mearns Fraser, Medical Officer of Health, and various preliminaries in preparation for the reception of the association were decided upon. The Corporation of Portsmouth is looking forward to the meeting with considerable enthusiasm, and a large sum of money has been voted to the Mayor for next year in order to enable him to extend the hospitality of the town to members of the association. Owing to the generous dimensions of the Portsmouth Town Hall, the adjoining Technical Institute, and several other large buildings in the immediate vicinity, exceptional facilities will be available for the various meetings of sections, discussions, and public functions, and everything points to a very successful meeting.

MR. J. B. N. HENNESSEY, F.R.S., whose death was announced in NATURE of May 26, was formerly deputy surveyor-general in charge of the Trigonometrical Surveys, Survey of India. He was appointed to the Trigonometrical Survey so long ago as 1844, and for some years worked in most unhealthy parts of India. For the following particulars of his career we are indebted to an obituary notice in the *Times*. While on long leave in 1863–5, Mr. Hennessey entered Jesus College, Cambridge, and worked under Profs. Adams, Challis, and Walton to improve his mathematical knowledge. He obtained sanction not only to learn photo-zincography at the Ordnance Survey, Southampton, but also to take out on return to duty an extensive apparatus, and to establish the process at the survey headquarters at Dehra Dûn. He taught the process to other officers, and the result was that in a few years hundreds of thousands of good maps were printed in place of those made by uncertain pen transfers. Not less important was Mr. Hennessey's work in taking in hand the vast accumulations of material provided by the labours of Lambton, Everest, and Waugh in their unrivalled trigonometrical operations, and reducing them to order by suitable scientific methods. The final results were brought together in fourteen large quarto volumes distributed gratis by the Government of India to scientific departments and associations throughout the world. Mr. Hennessey took a leading share in other scientific operations in India, including the determination of the standard bar, comparison of standards, and the measurement of base lines. He built two of the Indian observatories, and for the Royal Society mapped the telluric lines of the solar spectrum, and made prolonged actinometric observations. He was elected a Fellow of the Royal Society in 1875.

SIR FRANCIS SEYMOUR HADEN, who died on June 1, at ninety-two years of age, was chiefly known to the present generation as an etcher, and it was for his artistic achievements that he was awarded his knighthood. In his earlier days, however, he took a very prominent and important part in the progress of the medical profession. He was educated at University College, London, and continued his studies at the medical schools of the Sorbonne, in Paris, and of Grenoble. He became a Fellow of the Royal College of Surgeons of England, and honorary surgeon to the Department of Science and Art. He worked actively on various international juries dealing with the progress of surgical science. His report for the International Exhibition of 1862 gave an exhaustive review of European surgery. This report was chiefly remarkable for his earnest advocacy of the operation of ovariotomy, which had been ill-received up to that time. He was an active vice-president of the Obstetrical Society of London, and was chiefly instrumental in founding the Royal Hospital for Incurables. His name became prominently known in connection with the subject of burial. His investigations into the condition of the graves in a London churchyard which was in the course of being converted into a public garden showed the state of affairs to be indescribably revolting. He invented the *papier-mâché* coffin, and was a strong advocate of earth burial. He was strongly opposed to cremation, principally on account of its legal difficulties.

WE regret to see the announcement of the death of Dr. Elizabeth Blackwell, in her ninetieth year. She was the first woman to become a fully qualified medical practitioner, and the first woman whose name was placed on the British Medical Register. She lived many years in the United States, but never became denationalised. At the age of twenty-six she obtained entrance into the medical school attached to the University of Geneva, in the State of New York, where her "carefully hoarded earnings" just sufficed for her maintenance during her period of study. The professors declined to take the responsibility of admitting her; they referred it to the students. These were unanimously favourable to her admission, and pledged themselves that no conduct of theirs should cause her annoyance. On the completion of her studies at Geneva, N.Y., her degree was conferred in the presence of a great crowd. She came to England in 1849, and found much prejudice in professional circles. On coming to London in 1850 Mr. Paget (afterwards Sir James Paget), then Dean of St. Bartholomew's Hospital, gave her leave to attend the hospital as a student, and she was admitted to every part of the hospital except the department for the diseases of women! She studied for a year in La Maternité Hospital in Paris, where she had the misfortune to contract purulent ophthalmia from one of her patients. It cost her six months' illness and the sight of one eye, and ended her hope of making surgery her speciality. In 1851 she returned to America, and began practice in partnership with her sister Emily. She felt keenly the want of hospital practice, and established a dispensary, from which, in the course of time, there grew the New York Infirmary for Women, which was a women's hospital officered by women. On re-visiting England she had her name placed on the English register, and immediately afterwards an Act of Parliament was passed excluding the owners of foreign degrees from the register. In London she lectured on medicine as a profession for women. Among her audience was Miss Elizabeth Garrett (now Mrs. Garrett Anderson, M.D.). On the outbreak of the Civil War in the United States Dr. Blackwell returned to New York. She held the chair of hygiene in the Medical School for Women in New York, which was then established, and organised the services of sanitary visitors in the slums of New York in anticipation of modern developments. She returned to England, and had the "pleasure and privilege to encourage Dr. Anderson and Dr. Sophia Jex Blake in their pioneer enterprise in England." When the New Hospital for Women was founded she was on the consulting staff, and later, when the London School of Medicine for Women was opened, she held the chair of gynæcology until her health began to fail.

THE Christiania correspondent of the *Morning Post* contributes to the issue of our contemporary for June 6 some interesting particulars of Captain Amundsen's expedition to north polar regions, which started on that day. The journey will be made in the *Fram*, which is thus now on her third polar expedition. Among the problems which Captain Amundsen hopes to solve are the extent, depth, and character of the polar basin. He proposes to measure exactly the temperature and salinity of the streams of the polar basin, and to work at tide gauging, ice screw measurement, and wind speed. Captain Amundsen is prepared for seven years' absence. Once across the Atlantic, he will return in August to Christiansand to fetch Eskimo dogs. A few days later the *Fram* will shape its course from Cape Horn to San Francisco, where coal and provisions will be taken in. In June, 1911, a start will be made for Point Barrow. The *Fram* will follow the moving ice over the polar basin, and it is hoped that the actual Pole or its near neighbourhood will be crossed. The object of the expedition is purely scientific. Captain Amundsen expects to reach open water between Greenland and Spitsbergen in 1915 or 1916.

In connection with the annual grant voted by Parliament in aid of scientific investigations concerning the causes and processes of disease, Mr. Burns, the President of the Local Government Board, has authorised the following special researches. (1) A continuation of an investigation into protracted and recurrent infection in enteric fever, by Dr. Theodore Thomson, Medical Inspector of the Board, in conjunction with Dr. Ledingham, of the Lister Institute. (2) A continuation of an investigation into protracted and recurrent infection in diphtheria, by Dr. Theodore Thomson and Dr. C. J. Thomas. (3) A continuation of an investigation into flies as carriers of infection, by Dr. Monckton Copeman, Medical Inspector of the Board, in conjunction with Dr. Graham Smith and Mr. Merriman, of the University of Cambridge, Dr. Nicholl, of the Lister Institute, and Dr. Bernstein, of the Bacteriological Laboratory, Westminster Hospital. (4) A continuation of an investigation on the injurious gases evolved during artificial illumination, by Dr. J. Wade, of Guy's Hospital. (5) A preliminary inquiry into the relationship of certain special types of bacteria to the diarrhœa of infants, by Dr. C. J. Lewis, of Birmingham, Dr. Sheila M. Ross, of Manchester, Dr. Thomas Orr, of Shrewsbury, and Dr. R. A. O'Brien, of the Lister Institute.

The summary of the weather for spring, comprising the thirteen weeks in March, April, and May, just issued by the Meteorological Office, shows that the mean temperature for the period was nowhere very different from the average. The north-east and east of England were the only districts where the thermometer in the shade exceeded 80°; the highest temperature was 83° in the east of England, and the lowest 20° in the north of Scotland and in the south-west of England. The aggregate rainfall for the period varied in different parts of the United Kingdom, the total measurement being in excess of the average in the north and east of Scotland, in the east, south-east, and north-west of England, whilst in all other districts there was a deficiency. With the exception of the north of Scotland, where there was an excess of 3 inches, the difference from the average was nowhere large. The number of rainy days was in excess of the average in all districts except in the east of Scotland and in the Channel Islands. The largest measurement of rain was 12·91 inches in the north of Scotland, which fell on 60 days; the least measurement was 4·87 inches, in the Midland counties, which fell on 47 days. The duration of bright sunshine was nowhere very different from the average; the greatest excess was 28 hours in the south-west of England, and the greatest deficiency 40 hours in the south of Ireland. At Greenwich the mean temperature for the three months was 0·3° above the average, the rainfall was 0·93 inch more than the normal which fell on 45 days, and the duration of bright sunshine was 66 hours more than usual.

In the spring of 1909 the board of governors of the Camp-Fire Club of America decided that the time was ripe for instituting an active campaign for the protection of wild life throughout the United States. With this object in view a legislative committee, consisting of twelve lawyers and a zoologist, was formed. Special attention has been directed to the preservation of the grey squirrel and the fur seal, and to convincing the authorities of the desirability of placing all migratory birds under the control of the Federal Government. We have received a report showing the steps which the club has taken in the direction of saving the fur seal. For fully ten years the fortunes of the Alaskan fur seal, which once furnished a valuable industry, have been rapidly declining. Last November the club decided to appeal to Congress, the President, and the Cabinet for the adoption of a policy that would not only save the seals from further annihilation, but also rehabilitate an industry that, instead of yielding an income, now inflicts an annual loss. The club asked for three things:—no renewal of the lease for killing seals on the Pribilov Islands for commercial purposes; a ten-year close season for the seals; and treaties with Canada, Japan, and Russia for the total suppression of the industry of killing seals at sea. On April 21 a Bill securing some of these ends was signed by the President after having passed both houses of Congress. It is hoped that treaties with the other countries interested will be arranged. It may be predicted that the seal herds, now reduced from 4,000,000 to about 60,000, will have a much needed rest, and that if the killing of seals at sea, called "pelagic sealing," can be stopped by treaty, in ten years' time the herds will breed up to their original strength.

In the May number of *Man*, Mr. N. W. Thomas commences a series of notes on his recent work in Nigeria. In the present instalment he describes one phase of native decorative art, that to be seen on the walls of houses, secular or religious. Human figures, except that of a mischievous imp, Esu, are rare; but numerous animal forms are depicted, and these, particularly when found on the walls of shrines, seem to subserve a magical purpose.

Many suggestions have been made to explain the term Rom or Romani applied to the Gypsy race. The last is that of Mr. Leo Winer in the Journal of the Gypsy Lore Society for April. He points out that the name is coincident with Christian countries only, Europe, America, and Armenia. From the law of Charlemagne it appears that the Gypsies pretended to be pilgrims, and their name was usually connected with that of Rome. Ultimately, he thinks, it originated in the Greek Erimites, "a hermit"; and that when the popular etymology connected all hermits and pilgrims with Rome, all other terms designating pilgrims were so transformed as to bring them into keeping with this new conception.

Mr. C. L. Wragge announces in the *Auckland Standard* of March 7 the discovery at Bay of Islands of a series of engraved rocks, which he supposes to be of enormous antiquity and to be connected with the monoliths of Easter Island, which are a puzzle to antiquaries. Another correspondent, however, states that there are rocks between Whangaroa and Bay of Islands regarding which the Maoris have traditions dating back to the days of Captain Cook, and that a Government geologist who examined them has found that they are naturally decayed basaltic columns.

Mr. Wragge declines at present to give details of his discoveries, and until these are published it is unsafe to venture any opinion in regard to them.

THE Entomological Research Committee for Tropical Africa, appointed by the Colonial Office, has issued the first number of the Bulletin of Entomological Research, on which the committee and the editor (Mr. G. A. K. Marshall) may be warmly congratulated. Nearly half the number is occupied by Mr. W. Wesché's descriptions of the larval and pupal stages of West African Culicidæ, a most useful paper, giving characters for the identification of the larvæ and pupæ of twenty-nine species of mosquitoes, illustrated by seven excellent plates. The collector of the specimens, Dr. W. M. Graham, adds valuable field-notes, and the facts recorded are important alike to the entomologist and the medical man. Dr. Drake-Brockman contributes a short paper on blood-sucking Diptera from Abyssinia, Mr. R. Newstead writes on Coccidæ from Uganda, and Mr. E. E. Austen describes new African fruit-flies and a new Cordylobia—a muscoid genus the larvæ of which are subcutaneous parasites. In a short preface Mr. A. E. Shipley discusses the general work of the committee, mentioning that two experienced entomologists have been sent out for the purpose of research and instruction—Mr. S. A. Neave to Nyasaland and Mr. J. J. Simpson to Nigeria.

THE following interesting communication has reached us from Mr. Christopher Morse, of 3 Gladstone Road, Deal:—" All your readers have, of course, noticed a cat washing its face, but I expect very few have seen the same operation being carried on by a caterpillar. I observed one engaged in this process yesterday, and thought it a matter of interest. The creature was a smooth-bodied Noctuid larva feeding on grass." Of course, it is well known that butterflies often drink up water eagerly, and even bathe in it; while, as regards caterpillars, the drinker moth (*Cosmotriche potatoria*) derives its name from the caterpillars' fondness for water, often plunging their heads into the drops of water on the grass on which they feed (compare Tutt's " British Lepidoptera," iii., p. 167). Mr. Tutt, to whom we have submitted Mr. Morse's communication, thinks that in most cases the true legs of caterpillars would be too short to be used for washing the face (though in some exceptional cases these are long), and adds, " Of course, butterflies do it, and are well provided sometimes with hooks for the purpose, especially for cleaning their antennæ. They often have the appearance you name when thus employed. I think I noticed it particularly in *Rusticus betulae* and certainly some other species." It would be of interest if Mr. Morse could continue his observations, and especially identify the species of caterpillar which he noticed washing its face.

A NEW geological society, already very well supported, styled the Geologische Vereinigung, has been established at Frankfurt am Main, somewhat on the lines of the English Geologists' Association. While international in character, it aims especially at providing summaries of important geological work, which shall reach the increasing number of teachers of geology. By organising excursions, it hopes to come into touch with those who have charge of classes in schools. The subscription is only 10 marks annually, and each member will receive the society's journal, the *Geologische Rundschau*, the first number of which, published on April 26, is now before us. As the six numbers of this journal cost 12 marks a year (Leipzig: W. Engelmann), it is clearly profitable for readers also to become members of the society. The journal is edited by Drs. G. Steinmann, W. Salomon, and O. Wilckens, and is another sign of the activity of already busy men. Two original papers appear in this number which might easily have found a place in the older journals; but the signed reviews of geological knowledge are the main feature, and rank with those on current subjects in the English quarterly, *Science Progress*. The professional worker can, of course, rely on Keilhack's *Geologisches Zentralblatt*, which notices practically everything. The *Rundschau* is at once more literary and more limited in character, and has a critical usefulness of its own.

PROF. E. A. MARTEL makes a vigorous contribution to the controversy regarding the existence of *Grundwasser*, or a water table supported by an impermeable stratum, in the Karst region, in a recent number of *La Géographie*, p. 126. Prof. Martel considers that definite proof of the non-existence of such an underground reservoir feeding the subterranean rivers of the Karst is now available, and that the question is finally settled.

IN NATURE of May 12 (p. 319) reference was made to the important additions made to the monthly meteorological charts of the North Atlantic issued by the Meteorological Committee by the publication of current daily weather charts of barometrical pressure, temperature, and wind, compiled from reports by radio-telegraphy and through other sources. The value of these data is still further enhanced in the chart for June by a short discussion of the predominant features indicated by the maps. These show, *e.g.*, that from May 5–11 inclusive an area of high barometric pressure occupied a considerable portion of the Atlantic, and, in connection with the low pressure existing over these islands and Europe, was responsible for the abnormally cold and squally weather then experienced over this country. At the close of the period the advance of an anticyclone, shown to be moving from Barents Sea to Scandinavia, and the shifting of continental disturbances towards north-west, tended to modify those conditions. The unique reports of ice received by the committee show that icebergs were being sighted with increasing frequency between 42° and 52° N. latitude, and 39° and 52° W. longitude.

IN two papers contributed to the Proceedings of the American Academy of Arts and Sciences (xlv., 8, 9) Mr. Harvey F. Davies discusses the applicability of the law of corresponding states to the Joule-Thomson effect in water and carbon dioxide, with special reference to temperatures above 100° C., and gives a new formula for the total heat of saturated steam, which holds good within limits of error between 65° and 190° C. This formula really represents the difference of the total heat from that at 100° C., the value of which is assumed from previous work.

AT the 1908 Mathematical Congress at Rome Profs. C. Burali Forti and R. Marcolongo were appointed to draw up a report on the various notations of vector analysis with a view to unification. A critical review of their publications on this subject is contributed to the May Bulletin of the American Mathematical Society. It appears that the writers propose to avoid the use of the familiar " nabla," observing that this operator has different meanings as applied to scalar and vector functions; but this and the other points raised in the paper do not admit of adequate discussion in the present brief reference. The subject is of interest both to mathematicians and physicists, but it is clear from Prof. E. B. Wilson's reviews that much remains before a final system can be adopted.

It is now more than twenty years since Profs. Hertz and Hallwachs showed that when a metal plate charged with negative electricity and insulated is illuminated by ultra-violet light it loses its charge, and the rate of loss under standard conditions decreases with time. To the latter effect the title "photo-electric fatigue" was given. It was thought by some to be due to oxidation of the surface, by others to the direct action of the impinging light. Although Hallwachs disproved both these views six years ago, a considerable amount of work has been done recently by experimenters, who apparently still approach the subject from the point of view of the direct action of light, *e.g.* Dr. Aigner, of Vienna, Dr. Allen, of London, and, according to the *Résumé des Communications* of the Société française de Physique for May 6, M. Eugène Bloch, of Paris. All doubt as to the possibility of the incident light being the direct cause of the fatigue appears now removed by the experiments of Dr. Ullmann (*Annalen der Physik*, 1910, No. 6), who has traced it in the case of both copper and zinc to the formation of ozone in the air surrounding the plate by the passage of the light through it.

Messrs. F. Davidson and Co., 29 Great Portland Street, W., have given us an opportunity of examining the thermo-generator—a new form of the old thermopile—of which they are the agents for England and the colonies. The thermo-electromotive-force is produced by copper-antimony couples, fifty of these couples being connected in series. Each couple consists of a vertical, hollow, cylindrical copper tube, to the top of which is soldered a flat strip of antimony, which passes horizontally inwards and then downwards around a block of a porcelain-like substance. The copper tubes are arranged in two parallel rows of twenty-five each, and the antimony strips approach one another at the top. These strips are heated by means of a horizontal burner running the whole length of the apparatus immediately beneath the antimony strips. Gas or methylated spirit vapour is used for producing a number of jets, and the heat is retained in the white blocks which are in close contact with the antimony strips. An electromotive force of about 4 volts is obtained, and this is sufficient to illuminate a small lamp for medical or other purposes, or to run a small model lathe or fan. A total current of 3 amperes can be obtained through a galvanometer provided there be no appreciable external resistance. Less than one minute is required to heat the apparatus sufficiently to give its full yield. A slight deposit of oxide forms upon the surface of the antimony in the course of time, and requires to be removed by running a stick lightly between the rows while the apparatus is hot; otherwise it appears to give no trouble whatever. The thermo-generator may be used for hours continuously, and takes the place of dry batteries for running small illuminating lamps.

Sir William White contributes an interesting article on marine steam turbines to the *Engineer* for May 27. In reference to the excessive complication which has been charged against the Parsons type, and the greater simplicity credited in some quarters to the German arrangements, the author points out that, after large experience in the great Cunarders and in swift armoured cruisers, no serious practical difficulty has been experienced with Parsons turbines. Their advantages in regard to economy of steam consumption, greater ease of handling the engines, and smaller individual weights to be lifted when opening out turbines, have been proved to be considerable. Sir William is convinced that, on the whole, the Parsons type of turbine still maintains its superiority for marine purposes; but he is also of opinion that neither it nor any other type will secure universal adoption or be absolutely the best suited for all the varied cases which occur in practice.

An account of the trials of the Brazilian battleship *São Paulo* appears in *Engineering* for June 3. This ship is the product of Sir W. G. Armstrong, Whitworth and Co. and Messrs. Vickers, Sons and Maxim. The full speed on trial—21·623 knots—was realised with 28,645 indicated horse-power, while the guarantee was for 21 knots. Of special interest are the gunnery trials, which took place on June 1 off the Clyde. A complete broadside of eleven 4·7-inch guns was fired simultaneously with a broadside of ten 12-inch guns, establishing a record in the way of broadsides. Admiral Bacellar, the president of the Brazilian Naval Commission, pressed the firing key which fired this tremendous broadside; every one of the twenty-one guns responded. Excellent practice was also made at a target. Another important feature was the firing of two 12-inch guns in an upper turret, laid horizontally and fore-and-aft directly over a lower turret. Several Brazilian and two British officers remained in the lower turret during this test, and were able to state that they were not inconvenienced by any concussion. The ship is fitted with an electrical firing system, which renders it quite impossible to fire any gun in a position which is dangerous to any other gun or any ship's fitting.

We have received from Mr. E. Merck, of Darmstadt (and 16 Jewry Street, E.C.), his catalogue of chemical preparations for April, 1910. The list is remarkably complete, and it would be difficult to name any preparation required for general laboratory use which is not included. Many additions have been made to the last list, especially in therapeutical and bacteriological preparations.

The current number of the Bulletin of the Société d'Encouragement pour l'Industrie nationale (April, 1910) contains a very readable and interesting paper by Capt. Nicolardot on the rare earths and incandescent lighting. The pioneer work of Auer is described in detail, together with the history of the search for ceria and thoria, and an account given, with illustrations from photographs, of the manufacture of a mantle, starting with the quarrying of the monazite sand, and finishing with the burning off and fixing the mantle. The chief types of burner are also figured and described, including the latest forms of inverted burner.

A catalogue of the first eight hundred negatives made by the Geological Survey to illustrate subjects of geological interest, and of which prints or lantern slides are supplied at a fixed tariff, has just been published by the Board of Agriculture and Fisheries. The districts included lie chiefly in Cornwall and Devonshire, South Wales, and the counties of Cardiganshire, Derbyshire, Leicestershire, and Nottinghamshire. Copies of the catalogue may be obtained from any agents for the sale of Ordnance Survey maps, or directly or through any bookseller from the Ordnance Survey office, Southampton, price 6*d.* each.

Messrs. Heynes Mathew, Ltd., of Cape Town, have sent us a copy of a very complete illustrated catalogue of scientific apparatus, pure chemicals, and reagents. The list shows strikingly the improvement which has taken place in recent years in the supply of apparatus and material for scientific work in distant parts of the Empire. Messrs. Mathew have established a depôt in Cape Town where a full range of laboratory requisites can be obtained from stock. That they find it worth while to do this is suggestive testimony to the growth of science teaching in South African schools and colleges.

Messrs. Harper and Brothers announce for publication during June "The Science of Happiness," Dr. Henry S. Williams; "The Elements: Speculations as to their Nature and Origin," Sir William A. Tilden, F.R.S.; "Religion and Art in Ancient Greece," Prof. E. A. Gardner; "Electric Trains," H. M. Hobart; and "Continuous Current Machine Design," W. Cramp.

OUR ASTRONOMICAL COLUMN.

Astronomical Occurrences in June:—

June 9. 5h. 3m. Neptune in conjunction with the Moon (Neptune 4° 40′ S.).
,, 16h. 16m. Mars in conjunction with the Moon (Mars 3° 6′ S.).
15. 1h. 56m. Jupiter in conjunction with the Moon (Jupiter 3° 9′ S.).
17. 2h. 0m. Mars at greatest heliocentric latitude N.
19. 1h. 0m. Venus at greatest heliocentric latitude S.
,, 14h. 0m. Mercury at greatest elongation (22° 43′ W.).
21. 19h. 49m. Sun enters sign of Cancer.
24. 3h. 58m. Uranus in conjunction with the Moon (Uranus 3° 50′ N.).
27. 17h. 0m. Jupiter at quadrature to the Sun.

Halley's Comet.—With clear intervals between clouds during the past week, Halley's comet has not been a difficult naked-eye object for anyone who knew its position approximately.

Mr. Langton Cole reports that it was well seen at Sutton, Surrey, on May 22 and 31, and on the former occasion a short tail was visible to the naked eye; he estimates that on May 31 the comet was about as bright as a star of the third magnitude. At Gunnersbury on June 1 a naked-eye observation revealed the comet as early as 9·15 p.m., when it was apparently fainter than η Leonis (mag. 3·6).

A number of interesting notes on observations of the comet at various European observatories appears in Nos. 4413 and 4414 of the *Astronomische Nachrichten*. In the earlier number Dr. Franz records that on May 13, at the Breslau Observatory, the comet did not appear to be so bright as on earlier days; a variability of brightness is suggested, and it will be interesting to see if this is confirmed by other observers.

In No. 4414 many observers record that no trace of the comet could be detected on the solar disc during the time of transit. Dr. Wolf directs attention to the Bishop's rings surrounding the sun and moon on May 19, and suggests that they were more intense than if due solely to atmospheric effects. Meteors and auroræ were looked for at the Königstuhl Observatory, but were not seen.

Polariscope observations at several observatories gave similarly negative results. Prof. Franz records that on May 19 two bright arcs of light were seen in the north-west at Breslau, and may have been due to the comet. According to a telegram from Prof. Sykora, the projection of the comet on the sun was observed at Tashkent at 21h. on May 18. An increased intensity of the twilight at Odessa on May 18 is ascribed by Prof. Donitch as possibly due to cometary matter. Herr Archenhold reports a second comet-like object 1° south of Halley's comet at 9h. 30m. (Berlin M.T.) on May 22, but the observation is not confirmed by special reports from Bergedorf and Heidelberg. At Sonnwendstein, where, at an altitude of 1523 metres, several German observers had gathered for observations of the comet, the tail was observed from May 12 to 19. During this period its apparent length increased from 32° to 140°; its apparent position was the same on May 19 as on May 18. Dr. Hartmann, who was one of the party at Sonnwendstein, submits a special report dealing with the various aspects of the tail, and directs attention to the yellowish colour of the nucleus on May 20.

A number of notes dealing with observations of the comet were read at the meeting of the Paris Academy of Sciences on May 30, and appear in No. 22 of the *Comptes rendus*.

M. E. Marchand reports that observations made on the Pic du Midi and at Bagnères-de-Bigorre were badly interrupted by clouds. No striking special phenomena were witnessed on May 18 and 19, but it was noted that the dawn was especially bright and the sky tinted, as though there were an exceptional amount of dust in the atmosphere; the appearance is likened to that which was observed in 1902 and 1903 after the Martinique eruption. The unusual halos around the sun and moon support this view, as do also the observations of solar radiation subsequently made at the Pic du Midi station. Observations of the sun and of terrestrial magnetic and electrical effects revealed no abnormal condition attributable to the presence of the comet.

M. Popoff reports on the observations made at the Sofia Observatory (Bulgaria), and could not detect the comet projected on the sun's disc.

Further observations made at Athens are dealt with by M. Eginitis, who describes the forms of the nucleus and tail on May 18–20. No extraordinary atmospheric effects were recorded, and only two meteors were seen during the night of May 18. A splendid bolide was observed in Thessaly at 13h. 15m. (M.T. Athens), but is not connected with the comet. Between 7 p.m. and 8 p.m. on May 20 the comet's tail was seen with the equatorial, and was still apparently directed towards the west. The curvature was so great that the earth could not pass through the tail before the night of May 20.

MM. J. Baillaud and G. Demetresco describe photographs taken at the Paris Observatory on May 23, 24, and 28. Only very short exposures (thirty seconds to five minutes) were possible, and the tail is not shown. The nucleus is shown as an ellipse, the axes being 18″ and 14″ long. On May 23 this ellipse, otherwise uniformly dense, showed a condensation of 6″ diameter at its N.E. extremity, but this had disappeared on May 24. The nebulosity surrounding the nucleus showed changes from one day to another, and on May 24 recalled that surrounding the Pleiades star Maia.

The Spectroscopic Binary β Aurigæ.—In No. 22, vol. i., of the Publications of the Allegheny Observatory Mr. R. H. Baker discusses at length the observations of β Aurigæ as a spectroscopic binary. Since the duplex character of this star was announced by Miss Maury in 1889, many observations have been made at Harvard, Potsdam, Pulkowa, and Allegheny in an endeavour to remove certain apparent anomalies from the observed orbit. Assuming that the period was 3·9838 days, Miss Maury found, from the discussion of some 200 plates taken at Harvard, that there was an apparent reciprocal variation of intensity between the two components, but Mr. Baker now shows that this is not so; owing to the assumed period being slightly in error, the two components were alternately misidentified. The discussion of the Allegheny observations with those previously published shows that the orbit is practically circular ($e=0{\cdot}0\pm0{\cdot}0057$), and that there is probably a slight variation in the period, amounting to 0·000010 day, or 0·86s. per annum. The period now given is 3·960027 days + $0{\cdot}000010t\pm0{\cdot}000004$ days, the present elements being referred to the epoch 1905 September 11·7324, G.M.T.

An investigation of the secondary oscillation found by some observers is not confirmed, nor was Mr. Baker able to find evidence for the dispersion of light during its passage through space from β Aurigæ to the earth.

The Brightness of the Sky.—Commenting upon M. Fabry's recent determination of the brightness of the sky, Mr. Gavin Burns brings together, in No. 422 of the *Observatory*, the results obtained by various observers; they are as follows, each value being the brightness of one square degree of non-galactic sky expressed in terms of a fifth-magnitude star:—Newcomb, 1·15; Burns, 2; Townley, 2; Yntema, 5·76; Fabry, 1·46. Mr. Burns remarks that if, as seems probable, the brightness is a variable quantity, the results obtained by different observers are bound to vary considerably *inter se*.

The Accuracy of Radial-velocity Determinations.—In No. 4, vol. xxxi., of the *Astrophysical Journal* Prof. Frost issues a timely warning against attributing too great an accuracy to present-day determination of radial velocities. A tabulation of twelve values recently obtained by various observers for Arcturus, a simple problem, shows that they vary between −3·7 km. and −6·6 km., whilst the extreme range for any one observer varies from 1·2 km. to 4·5 km. Prof. Frost questions if we know the radial velocity of any star to the nearest kilometre.